In the Claims:

1. (Original) A piezoelectric actuator comprising:

a base made of a piezoelectric materials;

an annular piezoelectric element including a gap along a radial direction of the annular piezoelectric element, a fixed end of the annular element is connected to the base while the other end is free, said annular element is divided into at least two annular parts along directions of its circumference by the electrode patterns applied on at least one of two opposite surfaces of the annular piezoelectric element and polarization directions of the annular piezoelectric element; said annular piezoelectric element is polarized in a direction of its thickness;

a voltage driver coupled to said annular piezoelectric element, said voltage driver adapted to apply driving voltages to said annular piezoelectric element such that a first half of said polarized parts is at least one of expanded or contracted, while another half is at least one of expanded, contracted or remains unchanged to generate a rotary motion within a plane of said electrode surface in said annular piezoelectric element to cause said free end to move in the direction perpendicular to said gap.

2. (Original) A piezoelectric actuator set forth in claim 1, further comprising: an inner disc coupled to said free end, to provide an area on which an object to be driven is potted.

3. (Original) A piezoelectric actuator set forth in claim 2, wherein said annular piezoelectric element is constructed with a multilayer configuration, where the inner electrodes run into said base and are exposed on the side surface of said base to form external electrodes.

4. (Original) A piezoelectric actuator set forth in claim 3, wherein said base surrounds said annular piezoelectric element to provide a symmetrical configuration.

5. (Original) A piezoelectric actuator set forth in claim 4, wherein at least part of one of the two opposite surfaces of said base is higher than said annular piezoelectric element, while at the opposite surface said inner disc is higher than said annular piezoelectric element so as to control a clearance between moveable parts and stable parts in the actuator, and a bulge is provided at a center of said inner disc surface to restrain deformation of said annular element in its thickness direction.

6. (Original) A piezoelectric actuator set forth in claim 1, wherein said base and said annular piezoelectric element are made of a same material and by the same process and technique.

7. (Original) A piezoelectric actuator set forth in claim 1, wherein said base is made of a material different from said annular piezoelectric element.

8. (Original) A piezoelectric actuator set forth in claim 1, wherein polarization vectors are in the same direction for at least two of said polarized annular parts.

9. (Original) A piezoelectric actuator set forth in claim 1, wherein polarization vectors are in the opposite directions for at least two of said polarized annular parts.

10. (Original) A piezoelectric actuator set forth in claim 2, wherein said inner disk and said annular piezoelectric element are made of the same materials and by the same process and technique.

11. (Original) A piezoelectric actuator set forth in claim 2, wherein said inner disk is made of a different material from said annular piezoelectric element.

12. (Original) A piezoelectric actuator set forth in claim 2, wherein said annular piezoelectric element is C shaped.

13. (Original) A piezoelectric actuator set forth in claim 2, wherein said annular piezoelectric element and the inner disk are S shaped.

14. (Original) A piezoelectric actuator set forth in claim 2, wherein said annular piezoelectric element has a square frame including three straight beams, furthermore, a slit can be formed in the straight beam to control the alignment of internal electrodes.

15. (Original) A piezoelectric actuator set forth in claim 1, wherein said actuator is adapted to be connected at least one of the inner disk and the base to at least one other annular piezoelectric actuator to form an actuator stage, a direction of rotational motion for said actuator is opposite that for that at a connecting portion to an adjacent actuator.

16. (Original) A piezoelectric actuator set forth in claim 1 further comprising:

a plurality of disks;

a plurality of vertically aligned head sliders mounted on distal ends of a plurality of suspensions via micro piezoelectric actuators; and

a voice coil motor as a primary stage actuator to simultaneously drive the plurality of suspensions in a long stroke;

wherein said piezoelectric actuator serves as a secondary fine actuator to drive one of said head sliders in a fine stroke to position said slider to a predetermined position with respect to a surface of the said plurality of disks, said piezoelectric actuator is mounted on an associated flexure tongue of one of the said plurality of suspensions through the base, and the slider is potted on said inner disc of said actuator.

17. (Original) A piezoelectric actuator set forth in claim 16, wherein each of said plurality of fine actuators is mounted on a base plate of one of the plurality of suspensions through the said base of the actuator to drive a load beam to move the slider across data tracks of the surface of one of said disks.

18. (Original) A piezoelectric actuator set forth in claim 16, wherein said slider is potted on said inner disc of said actuator, the center of said slider is at least one of aligned to the center of said disc, front offset and back offset.

19. (Cancelled)

20. (Original) A method of actuating a piezoelectric actuator including an annular piezoelectric element and a base with radial gap where the annular piezoelectric element includes a fixed end connected to the base and a free end, the base is made of a piezoelectric material, the annular element is divided into at least two annular parts along the direction of its circumference by electrode patterns applied on at least one of two opposite surfaces of the annular piezoelectric element and polarization directions of the annular piezoelectric element, the method comprising:

polarizing said annular piezoelectric element in a direction of its thickness;

applying driving voltages such that a first half of said polarized parts is at least one of expanded or contracted, while another half is at least one of expanded, contracted or remains unchanged;

generating a rotary motion within a plane of said electrode patterns in said annular piezoelectric element to move the free end of said annular piezoelectric element in a direction perpendicular to said radial gap.